

## ABSTRACT OF THE DISCLOSURE

An ECR ion-beam source for use in an ion implanter has a sealed plasma chamber in which plasma is excited by microwave radiation of 2.45 GHz in combination with an external magnetic field generated by permanent magnets surrounding the plasma chamber. The magnets cause electron-cyclotron resonance for the electrons of the plasma thus creating conditions for efficient absorption of the microwave energy. The same magnets generate a magnetic field, which compresses the plasma toward the center for confining the plasma within the plasma chamber. The ion source also has an RF pumping unit that pumps into the plasma the RF energy. The RF pumping unit has a unique additional function of RF magnetron sputtering of solid targets converted into a gaseous working medium used for implantation in an ionized form. For obtaining elongated belt-type ion beams (having a width of 1 m or longer), the ion source may contain a microwave pumping system having several output windows arranged in series along the axis of the plasma chamber and on diametrically opposite sides thereof. The windows are continuously cleaned from the contaminants that might precipitate onto their surfaces. A standard-type sand blaster can be used for cleaning of the windows.